

High specific power flexible integrated IMM photovoltaic blanket, Phase I

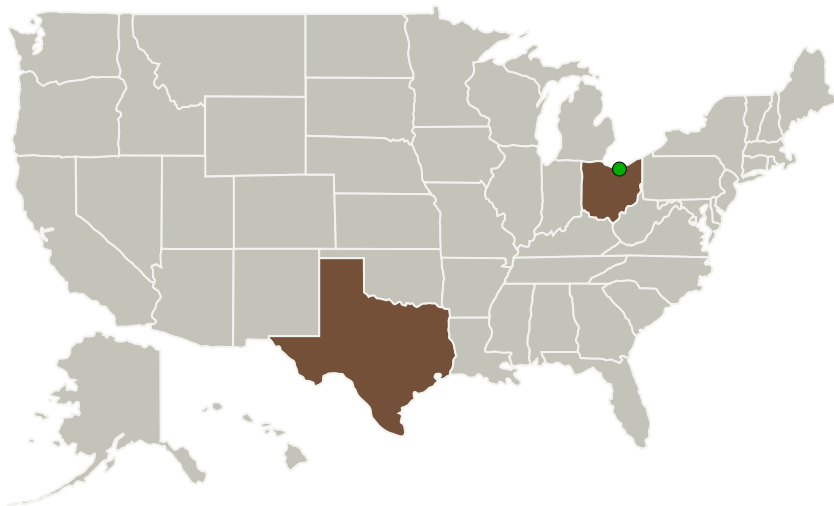
Completed Technology Project (2012 - 2012)



Project Introduction

Originally designed for space applications, multi-junction solar cells have a high overall power conversion efficiency (>30%) which compares favorably to amorphous silicon, CIGS and bulk heterojunction photovoltaic devices which are limited to <10%. Recent advances in manufacturing of Inverted Metamorphic Multi-junction (IMM) solar cells have opened new opportunities to greatly improve the specific power of the devices by means of removal of the epitaxial substrate. To date, flexible high efficiency IMM have been fabricated and demonstrated in the framework of a space cell with IMM released from the epitaxial substrate onto traditional coverglass. An increasing larger body of research is aimed at populating large area "blankets" with IMM and this has led to a number of approaches that includes removal of rigid epitaxy growth substrates and adherence to lightweight flexible webs or polymer films. So far, there is no economic and fast approach to efficiently remove the growth substrate. Nanohmics proposes to develop a non-destructive approach for transfer of IMM solar devices from rigid growth substrates into flexible high specific power solar cell blankets. The method will enable integration of state-of-the-art photovoltaics into a large area conformal "blanket" for space applications. The proposed effort will include development of a novel sacrificial intermediate layer on which high efficiency IMM photovoltaics are epitaxially deposited.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Nanohmics, Inc.	Lead Organization	Industry	Austin, Texas
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Texas

Project Transitions

▶ **February 2012:** Project Start

✓ **August 2012:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138221>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nanohmics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

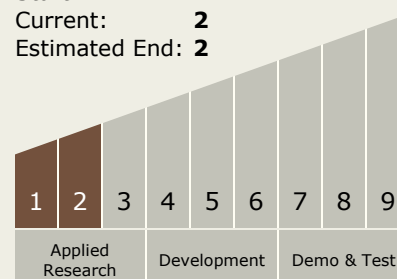
Carlos Torrez

Principal Investigator:

Qizhen "jim" Xue

Technology Maturity (TRL)

Start: **1**
 Current: **2**
 Estimated End: **2**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System